Gas Journal

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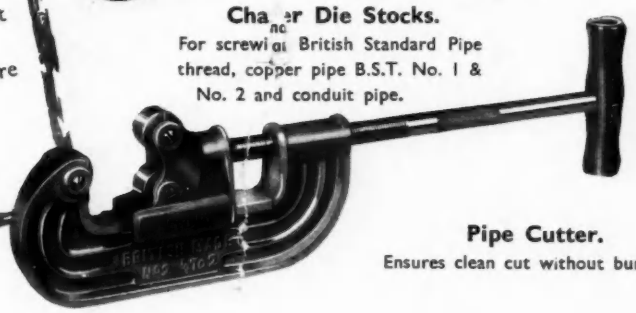

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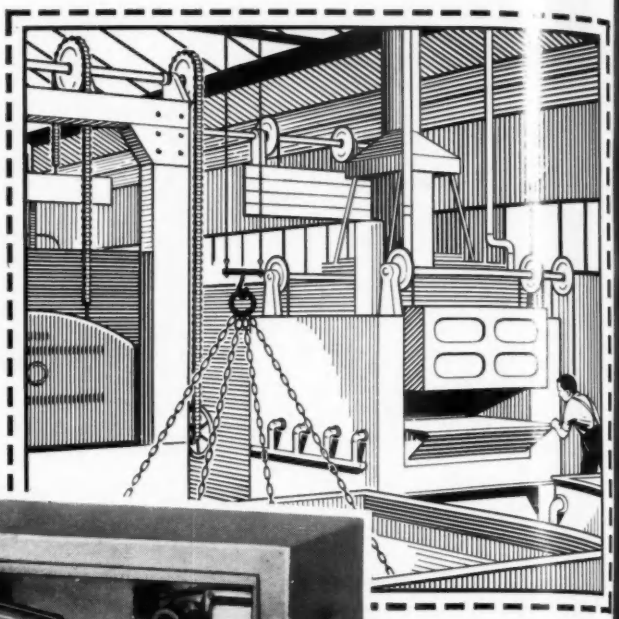

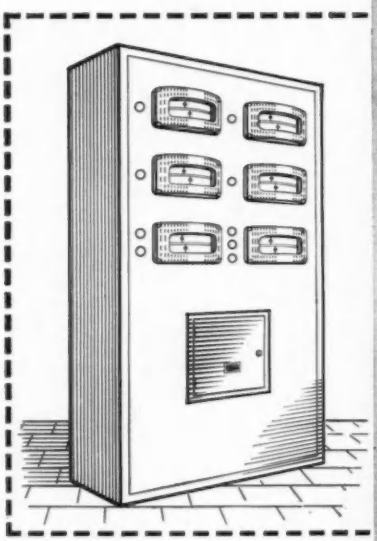

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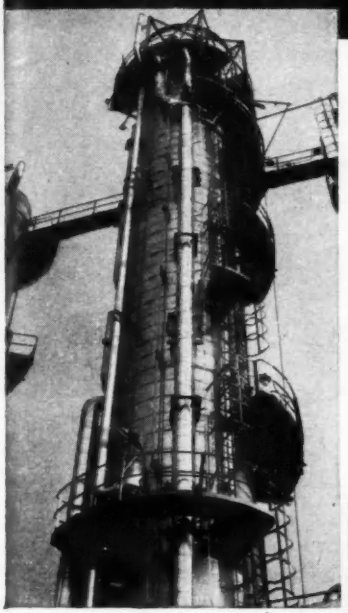

(Left) One of the 120ft. high regenerator vessels supplied by Babcock for the "Benfield" gas-purification plant at the Scottish Gas Board's "Lurgi" installation, Westfield, Fife.

(Below) The boiler-house, equipped with three 45,000 lb./hr. Babcock Bi-drum boilers with "Ignafluid" firing, and (centre) two benzol-absorber towers supplied by Babcock.

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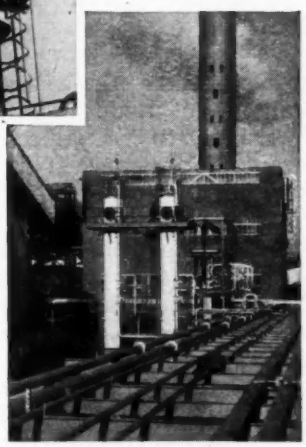

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Gas Journal

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WEDNESDAY, NOVEMBER 29, 1961

CONTENTS

EDITORIAL COMMENT

Research and Development 1961 - 315
What Salesmen Cost Britain - 316
Research and the Future - 316
'Precision for the Mighty' - 316
Who Buys Central Heating? - 316
Women's Advice - 317
Briefly - 317

27th I.G.E. AUTUMN RESEARCH MEETING

Chairmen's Technical Committee Report - 318
Gas Education Committee Report - 319
The Savoy Luncheon - 321
Research in the Gas Industry. By Sir Charles Ellis 322

THE JUNIOR ASSOCIATIONS

Yorkshire Juniors' Recent Meetings - 337

NEWS SUPPLEMENT

Finance for Two Methane Ships will be Raised in City - 332
Escaping Sahara Gas Blazes - 332
Gas Council at Building Exhibition - 332
Space Heater Sales Rise - 332
Another Fuel, Power Show in 1963 - 332
£500,000 Welding Shop Extensions for Whessoe Ltd. - 336
Gasfitting Training Successes - 336
Gas Dying? It's 'Wishful Thinking' - 336
Simon Engineering Dividend - 336
East Midlands Board Plans £300,000 Reforming Plant - 337
Safety Cookers for Belfast Disabled - 337
£170,000 Coke Plant Order - 337
Board Uses Employees' Suggestions - 337
Specialist Engineering - 337
Gas Industry Team Wins First Aid Trophy - 338
Personal Notes - 338
Obituary - 338
Coming Events - 338
Trade Notes - 338

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Publishers' Notice, See Page 311

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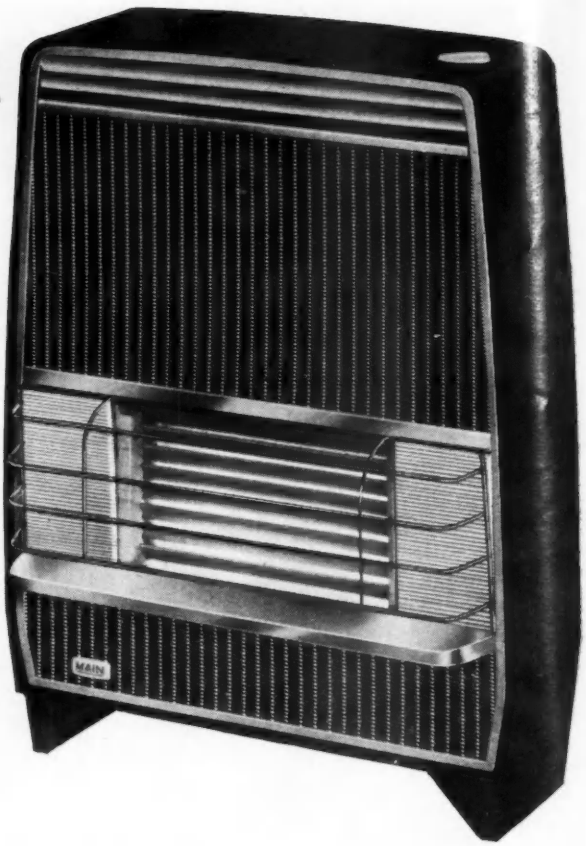

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Gas Journal

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Research and development 1961

IT might be said with some truth that anyone who wished to find out what were the technical problems facing the British gas industry, had only to open his copy of the programme of the Autumn Research Meeting of the Institution and read the titles of the papers to be presented.

The 27th Autumn Research Meeting held recently at Church House was no exception in this particular respect and the large number of papers to be presented made it necessary to run two parallel sessions on both afternoons. We did however miss the familiar presence on the rostrum of Dr. W. T. K. Braunholtz, who as Secretary of the Institution had almost become its personification, and the *genius loci* of these meetings.

It was with particular pleasure therefore that we heard the President, Mr. T. C. Battersby, announce his election to Honorary Membership of the Institution. At the same time we would like to welcome Mr. A. G. Higgins as his successor and congratulate him on the success and efficiency with which he organised his first research meeting as Secretary.

There is always a certain amount of routine to be got through in the form of the presentation and discussion of the reports of the different Committees of the Institution, and essential as this is, we always feel it is unfortunate that we have to wait so long for what for so many is the real purpose of the meeting, the presentation and discussion of the technical papers. It is perhaps this particular point which emphasises the difference between the research meetings and the annual general meetings.

They do, however, make it possible to discuss and criticise in open session certain points of policy in, for example, the important field of education in the industry. There can be little doubt that the need to educate and train young men coming forward as potential gas engineers has greatly increased, but the necessity of improving their powers of expression and communication does not seem to be being met. Mr. H. Teasdale's comments on the proposed new subject 'The Art of Expression,' though witty and in fact very much to the point did not really do very much to help in the solution of this difficult problem. We feel certain, however, that it gave considerable food for thought.

This and the other reports out of the way, the meeting was able to listen to the experts present their papers, which in some cases were the result of investigations covering quite long periods. The first and last papers to be presented undoubtedly caught and held the interest of the great majority of those present. Research in its own right, whatever the subject investigated, is now so essential to the well-being and future survival of an industry, that Sir Charles Ellis' paper describing the research work being carried out by the industry was awaited by all with a sense of expectancy and its contents devoured with relief. This was a worthy follow-up to Sir Harold Hartley's paper of last year, 'The Choice of Subjects for Research and Development.' We are publishing an abstract of Sir Charles' paper and commenting on it elsewhere in this issue.

The other highlight, the last paper of the meeting, 'Gas Reservoirs in British Porous Rock Structures,' by Mr. C. Johnson, Coal Officer to the Gas Council, must also have been awaited with some eagerness. The unusual nature of the subject, its importance for large scale national distribution schemes, and its effect on peak load problems, was clearly sufficiently interesting for many to postpone their departure from London to a later and perhaps less convenient train. Contributors to the discussion that followed were necessarily confined to the experts, a geologist, Dr. A. E. Haffner, Mr. G. U. Hopton, Mr. A. B. Densham and Mr. L. J. Clark, each giving his considered opinion on some particular aspect of a subject utterly new to most of the audience.

Though these papers may have represented the peaks, intervening papers covered subjects of great topical interest. The arrangement of parallel sessions is particularly valuable in making it possible for engineers with somewhat narrower and more specialised interests to foregather and learn more of their speciality.

Subjects of general interest discussed on the second morning of the meeting were safety and the composition of oils and p.f.d. to be used in gas making. Safety, though recognised far more than formerly for what it is, is a difficult subject to invoke enthusiasm, but it was most noticeable how well attended this particular session was, and that the discussion nearly overran the time allotted to it.

What salesmen cost Britain

BRITISH companies spend as much on running their sales forces as they do on Press and T.V. advertising. This enormous annual sum of over £350 mill. is one of industry's major costs. The result—many salesmen spend less than 10% of their total available time in actual selling. The remaining 90% is spent in travelling, waiting, discussing the weather and placing point of sale material and other fringe activities.

Widespread criticism of British companies' sales' skills at home and abroad demands, two things. Firstly, that a salesman's selling time should be increased and secondly, that the increased time should be used with greater skill.

The opinion of the members of a London School of Marketing study session was that the remedy is largely in management's own hands. Today's competitive pressures demand that selection and training of salesmen should be undertaken with far greater care.

Guidance on some of the ways to improve management skills in this area was given by Professor Eysenck of Maudley Hospital, who stated that while most business executives felt they had an unfailing skill in selecting the right man this was, in fact, almost impossible. Scientific evidence points to the fact that random selection based on the toss of a coin is often as successful as many popular and widely advertised selection techniques.

Mr. Alan Burn, Director of Sales Audits Ltd., quoted examples. The sales of companies, where properly designed induction and training methods are employed, have resulted in an increase exceeding 60%; but only one in ten of British companies provide formal and continuous training for their salesmen.

Research and the future

THE health of an industry may be gauged by the extent of its research and development activities, the forward thinking of its senior technologists and engineers, and the keenness of the rank and file to adapt themselves to new techniques.

The gas industry has a great tradition behind it, and in its early days, competition between rivals operating in the same area of supply could be so intense that considerable ingenuity had to be used for an undertaking to keep in business.

Today the problems are quite different but competition of another kind still faces the industry and the solutions to the problems posed can only be found by research, so Sir Charles Ellis' paper to the recent research meeting of the Institution was, we thought, particularly timely.

In it Sir Charles, who is scientific adviser to the Gas Council, and therefore a scientist in the very broadest sense and not a gas engineer, reviewed the whole field of research work being undertaken at the London and Midlands Research Stations, covering both production and utilisation. In his particular rôle he was able to take a more objective and detached view than someone taken up in the everyday running of a production station or a research laboratory. We may expect then to find balanced views and opinions expressed on some of the processes we know are under development, or have been impatiently waiting for several years to see tested on the semi-commercial scale. We were not disappointed.

In the introduction to his paper, Sir Charles deals with the time which must elapse between initiating a piece of applied research work in the laboratory and its appearance as a full-scale commercially successful process. This may take 15 years or more; in this period too the needs of the industry may change and the application of the process may no longer be relevant. In consequence the moment when its development should cease depends upon sound judgement, and an ability to sum up the many factors affecting its usefulness under continuously changing conditions.

Such a course needs to be treated with extreme care, since if carried to its logical conclusion, it might well result in little or no achievement. We think, however, that there is little fear of this happening in the gas industry at present, but we are a little concerned with the present spate of modern developments coming in from abroad. It is not that we have any objection to them as such, in fact we welcome them as being ready-made processes which may be modified to suit British conditions, but we do deplore our own lack of equally good or better indigenous processes of which we might make full use ourselves and even export them too.

In this country development research on the present scale started later than elsewhere, but we have every hope that the outcome of the research programme reviewed by Sir Charles will help the industry in this country to take the lead once again in *gas manufacture* anywhere in the world.

'Precision for the mighty'

THE Gas Council has always realised the value of the well-produced and technically accurate film in demonstrating how gas may help all potential consumers, especially the industrialist, on whatever scale he may be operating. Its latest colour film, 'Precision for the Mighty' recently shown to the Press lives up to its past successes.

The industries using large quantities of gas which it has chosen to illustrate this film demand very high standards of accuracy in the manufacture of their products. At the same time heat treatment is an important part of the finishing process which, combined with a proper control of the atmosphere of the reheating furnaces, must avoid the spoiling of the costly final products.

The manufacture of ball and roller bearings depends on the proper heat treatment of finally-machined semi-finished products, the accurate flame hardening of vital sections of massive earth-moving equipment guarantees reliability in the field remote from repair shops, while the proper heat treatment at accurately maintained temperatures of the rolling of stainless steel continuous strip probably means the success or failure of the whole operation.

Clearly gas by its flexibility, its adaptability and its ability to combine all these qualities, together with its convenience for the maintenance of special atmosphere and the firing of continuous annealing furnaces, will carry out such duties better than any other refined fuel.

These points the new film brings out, and though by now the use of colour photography is almost a commonplace, its application to the filming of heat treatment processes stresses certain points that might well be lost if shown only in black and white.

Who buys central heating?

THE best prospective customer for central heating of all kinds was defined by Mr. A. C. Hazel, Managing Director of Powell Duffryn Heating Ltd., when he addressed the National Institute of Hardware's Autumn School at Abingdon, Berks. He revealed that men, not women, initiate more than 60% of central heating purchases.

And what sort of man is the ideal prospective buyer?

According to Mr. Hazel he earns £1,500 a year or more, owns his home and appreciates that central heating increases the value of his property, is married and between 25 and 55 (the 40 to 50 age group being the biggest purchasers), and probably already owns a TV set, a refrigerator and most of the major appliances, including a food-mixer.

He pointed out that while every householder is a prospect for some form of heating, the lower end of the scale would remain the market for portable heating equipment and the open fire. The advent of TV was a big factor in selling heating, because nowadays some people wanted to watch and others did not. So two rooms had to be heated. Other reasons for an increased demand for better heating mentioned by Mr. Hazel were the tendency for people to wear lighter clothes and the increased warmth in factories and offices which meant that the worker expected the same standard in his home.

'Nowadays a husband works in a warm office, sits in a warm car and if there is a difference in temperature in his home, it is apparent instantaneously,' said Mr. Hazel. 'Nothing is more conducive to disharmony than a husband leaving his warm car and shuddering in a cold hall.'

Women's advice

WE do not know how many ladies attended the Harrogate conference, but their numbers were remarkably small in comparison with the extent to which their voices were heard. Indeed, the conference was something of a triumph for the fair sex and there is reason to believe that the gas industry may stop being quite so stubbornly and unequivocably masculine in future.

Whose were the feminine voices and what had they to say?

Miss Edith Baillie, Chief Home Service Adviser, N.T.G.B., apart from making some very pertinent remarks about the need for room heaters to harmonise with period furniture, showed how home service advisers could sell the idea of central heating to the housewife and could do follow-up calls on dwellings where selective air heating had been installed.

Miss Joan Langley, Chief Home Service Adviser, S.W.G.B., contributing to the paper on the cooking load, indicated what a woman really required of her cooker and reviewed the various ways in which the industry could influence the opinions of women of all age groups and social levels.

Mrs. Elsie Greig, Advertising and Publicity Officer, Sc.G.B., made a valuable contribution on the subject of the housewife's growing need of hot water. She showed how the repetition of the word 'clean' was used in modern advertising for a variety of products, and how naturally gas lent itself to such a fashionable campaign.

At other points in the conference we heard Miss Maywen Godby urging that means must be found of overcoming antipathy by gas fitters to new ideas, and advocating the use by the industry of show houses; home service advisers emphasising the extreme youth of modern brides and describing ways to win them over to gas; and Mrs. Joan Robins, Home Service Adviser to the Gas Council, delivering some stiletto jabs at the multiplicity of models of cookers and water heaters, and gently reprimanding mere men for worrying because a housewife did not use all the gadgets on her luxury cooker.

These aspects of consumer behaviour and female thinking are basic to this industry's fortunes. Perhaps we have not listened enough to our feminine counsellors in the past; failure to do so now might prove disastrous.

BRIEFLY . . .

Sales drive

A young man who may quite legitimately be expected to go far is the 17-year-old Nottingham apprentice gasfitter who, so *Emgas*, employees' magazine of the East Midlands Gas Board reveals, not only passed his driving test at the first attempt, but forthwith proceeded to sell the examiner a GasMiser. Still on the subject of room heaters, the same journal tells of a 95-year-old consumer who, after being sold one of these appliances, turned to his already ageing son and said: 'When we've paid for this one, we'll have another for the front room.'

They've had their chips!

According to Mr. W. H. Elkerton, Director of Marketing, West Midlands Gas Board, speaking at the Harrogate Sales Conference, damage to appliance enamels costs the boards and the manufacturers something like £1 mill. a year. That is no small sum, and one admires the Gas Appliance Division of Allied Ironfounders for making their new and highly effective system of Leisure cooker packing the theme of a spirited advertising campaign. It is claimed that the method reduces damage by 70% —a promise of freedom from expense and nuisance which must inevitably enhance their product in the industry's eyes.

Locking the stable door?

We in the gas industry often talk as though the swing away from solid fuel and towards gas for space heating were the result only of the modern housewife's distaste for clearing ashes. But probably the strongest factor in the conversion is the solid fuel distributors' long tradition of inadequate stocking and delays. Lord Robens seems to be aware of this, for he is busy trying to ginger up the coal merchants and bolster the householders' flagging confidence. Last week he said the National Coal Board was undertaking to *guarantee* supplies of Sunbrite (the smokeless fuel made by the N.C.B. and other coke oven producers) in the right sizes for every type of boiler.

The afluence of incohol

The demon drink forced the North Eastern Gas Board and Radiation Ltd. to move their theatrical novelty 'Fare and Warm' to the Princess Hall, Bingley, after its opening at the Keighley Temperance Hall, last week. Many types of dishes using wines are cooked on the stage and passed down to the audience for tasting, the menu including kidneys in Burgundy sauce, lemon meringue pie, crepe suzette and the appropriate wines. Apparently the trustees of the Temperance Hall imposed a ban on the show because the deeds of the society prohibited the consumption of alcohol on the premises. If the surprise decision caused the organisers a few headaches they should have been gratified by the publicity. It's an ill wind. . .

I.G.E.

27th Autumn Research Meeting

THE 27th Autumn Research Meeting of the Institution of Gas Engineers was held at Church House, Westminster, last week, the President, Mr. T. C. Battersby, being in the chair.

Mr. Battersby welcomed visitors from overseas—M. R. H. Touwaide, of Belgium; from France, MM. J. Coq, J. Gerard and A. Lihrmann; from Germany Dr. W. Litterscheidt and Dr. Th. Schmidt; with a member home from Hong Kong, Mr. T. Spikins, Manager of the Hong Kong and China Gas Company. He was also expecting Prof. C. Padovani, from Italy.

Two honorary members, 13 members, 39 associate members, 108 associates and 24 graduates were elected.

The President said only one of the two members elected to honorary membership was present. He was Dr. W. T. K. Braunholtz, formerly Secretary of the Institution.

Dr. A. E. Haffner, Chairman, Gas Education Committee, presented the 38th report of that body and after discussion, medals and prizes were presented.

The Charles Hunt Memorial, said Mr. Battersby, was endowed by his family, and for many years his son, Mr. Gilbert Holmes Hunt, came personally to present the awards.

Unfortunately, Mr. Holmes Hunt died in the early part of this month, but he would be remembered for the interest which he took in education in the gas industry—and he was not a gas engineer.

The President then presented the following medals and prizes.

Charles Hunt Memorial Medals for 1961:

Peter Henry Dixon (*Grenoside*): *Associate membership examination—gas engineering* (*manufacture*).

Albert Thomas Gardner (*Birkenhead*): *Associate membership examination—gas engineering* (*supply*).

James Archibald Maclay Memorial Prizes for 1961:

John Lockhard (*Dalkeith, Midlothian*): *Gas technology* (*supply*).

Thomas George Milner (*New Barnet*): *Gas salesmanship and consumer service.*

Mr. H. S. Cheetham, as Chairman of the Chairmen's Technical Committee, presented the 22nd report.

Chairmen's Technical Committee report

THE Chairman of the Chairmen's Technical committee, Mr. H. S. Cheetham, presented the 22nd report. Two chairmen had resigned during the year, the President from the chair of the Safety Rules Committee and Mr. G. Le B. Diamond from the chair of the Effluents Committee. As successors they had Mr. Dyde as Chairman of the Effluents and Mr. Palmer as Chairman of the Safety Rules Committee. The Secretary, Mr. Higgins, or the Assistant Secretary, Mr. Davidson, had been appointed to succeed Dr. Braunholtz on the various committees on which he served.

They had given active support to the International Gas Union, and in particular he referred to the 8th International Gas Union Conference in Stockholm.

He said that the Council had accepted an invitation from the Institute of Fuel to join with them in a conference on Total Gasification, to be held in Hastings in the autumn of 1962. He suggested that no technical investigation they had in hand was of greater importance than that on effluents. Their problems in connection with the disposal of effluents were becoming more serious than ever before.

Mr. J. H. Dyde (Chairman, Eastern Gas Board) said that the main feature of the year's work had been the completion of an investigation into various processes for the biological purification of gasworks and gasworks-type effluent in the absence of sewage.

The Rivers (Prevention of Pollution) Act, 1961, introduced as a private Bill by Mr. J. M. Temple, had the popular support of all sides of the House.

The gas industry was not permitted to discharge any of its waste products, however much purified, into an inland waterway. Through the representations of the Gas Council this matter had now been satisfactorily dealt with in the 1961 Act, and the gas industry would therefore receive the same treatment as other industries.

The Ministry had promised that the gas industry would be consulted in connection with the regulations, many of them of a technical character, which it would prescribe in relation to the information to be submitted to a river board.

With regard to the normal discharge of the difficult effluents to sewage authorities, the new Public Health Act enabled Local Authorities to charge for certain effluents which had hitherto been exempt through prescriptive right previously enjoyed under Section 4 of the 1937 Act now repealed. Local authorities also had power to vary charges and conditions imposed in their consents—past or future—with a two-year limit on review.

It was in connection with the technical conditions attached to these consents that the Effluents Committee had considerable work expanding into the future.

Mr. J. E. Davis (Chairman, Code of Practices Sub-Committee) said that codes of practice were intended to be a

statement of the best current practice. If their revision were too long-delayed they could encourage the crystallisation of out-dated methods. If revisions were undertaken too frequently they could lead to the adoption of novel practices which had not yet gained the seal of experience.

Referring to the Codes prepared by Panel B, he said that the time-honoured custom of keeping the services of gas, water and electricity separate was in fact no real safeguard against hazards arising from stray current. It was hoped that fairly rapid agreement could be reached with the Institute of Water Engineers and the Institution of Electrical Engineers, but unfortunately these discussions would take much longer than was foreseen.

Mr. F. L. Atkin, (Chief Distributing Engineer, West Midlands Gas Board; Chairman of the Gas Distribution Committee) expressed concern with the possible effect of a governor failing and allowing high inlet pressures to be released into the district. The Committee were engaged in a preliminary survey on the possible effects of increased pressures with a view to establishing a maximum pressure which might be permitted on the district under emergency conditions.

He referred to the agreement which had been reached between the industry and the manufacturers on the standardisation of a joint. All manufacturers had agreed to supply a standard bolt-type Vee ring joint.

During the course of the year they had supplied information to the Committee on Unaccounted-for Gas, particularly in respect of leakage from mains and services and from gas holders.

Mr. E. T. Pickering (Central Laboratory for the West Midlands Gas Board) said that the sub-committee on biological treatment of gasworks effluents had concluded that when biological treatment of gasification and carbonisation liquors was carried out to its practical limit, there still remained in the effluent certain constituents that were oxygen absorbing, and ammonia which might, under certain conditions, be toxic to fish.

The cost of reducing ammonia contents to very low values would be substantial, but the cost of reducing the oxygen absorbing constituents to a low value could be prohibitive.

He said that an investigation of this subject was important and indeed urgent, if large Lurgi plants were to be built in the East Midlands and it was contemplated that their biologically treated effluents be disposed of to surface waters.

Mr. F. Harvey (West Midlands Gas Board), mentioned the multitude of machines and methods available for mainlaying projects. He considered that the time was opportune for a pooling of knowledge to be undertaken. A few broad principles would be an invaluable guide.

While it was obviously essential to determine the limiting pressure that could be permitted in a low pressure system, it was even more vital to ensure that this pressure could not be exceeded.

Mr. E. H. M. Badger (London Research Station) said that at the London Research Station they were investigating the chemical constitution of the material remaining after biological treatment. In collaboration with the National Coal Board a tanker of dephenolated Lurgi effluent was obtained from Dorsten and it was found that the residual phenols and the thiocyanate could be removed by biological treatment for periods of 12 hours or less.

The full-size units at Southall had been operating for over a year. It was known that one 5-ft. diameter Simplex cone was capable of removing 12-15 lb. per hour of B.O.D. from sewage, and the rate of removal of permanganate value from spent gas liquor was of the same order. A novel feature of the Southall plant was the very high aeration capacity.

Mr. S. C. Porter (Chief Chemist, West Midlands Gas Board) referred to the venting of p.f.d. to a gas main, and questioned whether this practice did in fact ensure remoteness of explosion risk. If access of air should occur, the upper explosive limit of such a mixture would be reached sooner than in the case of p.f.d. stored under its own vapour.

Concerning displacement of released oxygen by gas when the tank was full, he could not agree that this could be effected in practice, since each fresh delivery of p.f.d. brought oxygen to the system.

Mr. T. B. V. Hirst, on the standardisation of dimensions of meters, asked if, for new installations, work was to be based on two pipes—the service pipe and the installation pipe—with a gap between them to be bridged by the meter? Or if these two pipes were to be permanently united into one pipe, from the outset, with a branch to which the meter was coupled by one union joint? If the latter, permanent electrical and mechanical continuity was assured.

Gas Education Committee report

THE 38th report of the Gas Education Committee was presented by the Chairman of the Committee, Dr. A. E. Haffner. He said that the Pembroke College Refresher Course had been organised to meet the needs of distribution engineers, and members of the course were mainly derived from the nationalised industry, but there were also members and lecturers, from the contracting industry.

Plans were already being made for the next refresher course at Pembroke College, to be devoted to utilisation engineers. A panel was at work to select lectures which would cover technical rather than commercial aspects.

The short course for teachers was exceptional in that it catered for teachers in gas technology, whereas most previous courses had been devoted to the larger number of teachers in gas fitting. It was hoped that the 1962 course would be organised for teachers of gas fitting and teachers of gas technology (utilisation) because between them there was much common ground.

During the summer of 1960 two young engineers attended the summer school courses of the Institute of Gas Technology, Chicago, through the Woodall-Duckham Educational Fund. There was still room for technical communication of this sort with the American gas industry, particularly as their distribution schemes, underground storage and use of natural gas began to need the same sort of techniques as were in successful large-scale operation in the U.S.A.

The revised scheme for examination of the City and Guilds in gas fitting would become operative from May.

Similarly integrated syllabuses in gas technology (manufacture) and gas technology (distribution) were still under discussion. To some extent the organisation by boards of short intensive practical training courses and courses for potential foremen had removed the need for external recognition by way of success in the City and Guilds examination.

Dr. Haffner referred to the impact of the revision of the by-laws of the Institution, the creation of a Graduate Class of member and the need to re-orientate courses in three streams. A three-year sandwich course would lead to graduate recognition, but a four-year course would need to be the basis for associate membership. A number of colleges had submitted schemes for four-year sandwich courses to meet these new needs, and a sub-committee had examined the proposals. There was a possibility that there might be too few students in a particular stream at a particular college to justify expert instruction. Some degree of local specialisation seemed desirable, but the Institution and its Education Committee should confine themselves to using their influence to ensure that standards of training were maintained to reach the professional requirements.

Review needed

But the best use of educational facilities was a subject which urgently needed review and decision. The district education committees had been reviewing their work and assessing their usefulness in the changing context of expanding internal education and training by area boards through full-time officers.

These committees were considering how best they could fulfil remaining functions, and their conclusion would no doubt feature in the next report.

Mr. L. F. Randall, Chairman of the Sales Training Committee of the Education Committee, drew attention to the fact that the number of candidates who sat for the written examination in the Principles and Practice of Gas Salesmanship was the highest number yet recorded. More and more they were reaching the position where they must sell first and manufacture afterwards.

He thought it was desirable to train their young men on the service side to have both technical ability and selling ability, but he did not think it desirable to train their sales specialists to any degree of technical competence.

In referring to the examination results, the examiners had pointed out that many candidates who had shown ability in the written papers had admitted to having no practical experience in selling. This was a difficult problem particularly for many young men who were not connected with the selling side whatsoever and who, therefore, did not have the opportunity of receiving some practical tuition in the art of selling.

A new subject called 'The Art of Expression' had been introduced, and he hoped that this would have the effect of raising the standard of the written and spoken word. There was no doubt that the examiners, particularly of the written papers, were often very concerned at the low standard exhibited.

Mr. F. Caunce referred to the sandwich courses which were now the pattern for education for most of the engineers who were coming into the gas industry. Nevertheless, they had reached the time when the flow of students seemed to be settled, and they had some problems relating to the provision of sandwich courses which might be said to be mainly economic.

They thought that the provision of technical education should be subjected to some scrutiny. He said they should like to see the major technical colleges doing much more in the way of applied research.

Mr. H. Teasdale said that he welcomed the revised regulations for the award of the certificate in respect of consumer services. But he wanted to see the examination paper in gas utilisation even more closely attuned to the needs of those concerned.

He was also dubious about the new paper entitled 'The Art of Expression.' The specimen paper had proved to be an orthodox paper in English. There had been a change in the title—that was all. It was academic in outlook, with an undue emphasis on clear and logical thinking. The salesman was not primarily interested in logic. It was the emotive use of language which persuaded customers to buy. But there was no reference to the emotional overtones of words. Nothing about the techniques of asking questions and seeking information or agreements. Nowhere in the syllabus was there any reference to persuasion.

Mr. R. F. Hayman (Industrial Gas Officer, Gas Council), referring to sandwich courses, said that while he might be reasonably happy about the standard of the examinations, he was far from happy about the future; he saw so much of this foundation work based on a good teaching staff being exposed to the risk of waste.

They all believed in the expansion of the gas industry, and recent events had been giving a promise of more than a hope for increased sales of gas. Surely with this new outlook, it was not too much to ask that sufficient students could be enrolled to fill say even three classes a year? He did not believe for one moment that even this intake would saturate the technical requirements they would need if they were to keep abreast with the expansion to which they were all dedicated.

Mr. G. H. Potter, dealing with comments made by various examiners in the results of examinations, said that one which appeared fairly regularly was that answers were poorly presented. He was sure that it was realised that in order to become a competent engineer it was not only necessary to have adequate technical knowledge, but also to be able to think logically. This often appeared to be a particular weakness.

'Serious situation'

In the 38th report it had been noted that the Institution Safety Recommendations did not appear to have been receiving the study they deserved from prospective works engineers and managers. This was a most serious situation.

The Chairman of the Board of Examiners for the year 1960-61, Mr. W. H. Tarn, had asked him to say that there had been some evidence that they appeared to have been training rather specialised utilisation engineers to the detriment of producing good all-round distribution and supply engineers.

Dr. A. E. Haffner said that Mr. Caunce's remarks on sandwich courses were very much to the point. This was the most urgent point that they had to deal with—how best to make use of the financial layout for the educational facilities and how to make the best use of the quality of teachers in those that were available.

The idea of major technical colleges and colleges of advanced technology entering into the field of applied research was very forward-looking and desirable, and already there were signs that this was taking place.

Mr. Randall said in reply to Mr. Teasdale that they could not find an all-embracing course in existence to which their young men could go to learn to speak reasonably well.

and to spell reasonably well, and to hold an intelligent conversation. 'The Art of Expression' was introduced specifically to try to overcome this difficulty.

They did not say that this new subject was the beginning and end of the trouble, but it took them some way along the road. The criticisms were most useful because perhaps they were not moving quite fast enough in that direction.

The Savoy luncheon

Proposing the toast 'The Guests,' at the I.G.E. Autumn Research Meeting luncheon at the Savoy, London, Mr. Battersby said that during his year of office, he had attended several Continental meetings of gas engineers, and everywhere he was received most hospitably. He was privileged to listen, perhaps with undisguised envy, to their experiences with natural gas, their transmission projects and the underground storage of methane and liquefied petroleum gases.

He welcomed on behalf of the Institution, friends from the Continent.

He said: 'I particularly welcome members of the Institution who give so much time to committee work and the authors of papers, for without their efforts there would be no research meetings. We are pleased to have with us the medallists and prize-winners, young men on the threshold of their careers in the industry at a time when the industry can offer them both interest and excitement but, above all, a satisfying vocation'.

Debt to universities

He emphasised the debt that the industry owed to the universities, as from them the more fortunate members of the Institution received what a former President described as their primary education.

Today, under the Gas Act, the Gas Council had the direct responsibility for research and development, and for the research contributions of the annual general meeting they were indebted to the Chairman of the Gas Council, Sir Henry Jones, a Past President of the Institution, who was directing the industry through the most difficult transition period that had ever confronted it.

The problems which they had surmounted in the past had revitalised them, and with that same vigour they would face the future.

He said: 'In this period of intense competition which faces our industry today, engineers are of necessity concerned with short-term considerations, but it is gratifying to know that the Gas Council has set up a basic research group to explore a much wider field covering new aspects of scientific discovery, reaching far beyond the present conception of gas production which might lead to the development of new production processes and new methods of utilisation'.

To Sir Charles Ellis, Scientific Adviser to the Gas Council, Mr. Battersby expressed thanks for the interesting address he had given that morning and for the discussion he stimulated, and said that Sir Charles had made it abundantly clear in his paper that the industry was not sitting on its haunches only awaiting the arrival of methane.

He said: 'This industry, like every other industry, does not survive by its inevitable momentum, but by the constant struggle of those engaged in it to satisfy the changing demands of society in a highly competitive field.

'The picture painted by Sir Charles shows that the research work which is being undertaken conforms to a well co-ordinated effort covering large-scale manufacturing processes down to the details of domestic and industrial uses of gas and the underground storage of gas.

'As engineers, we are encouraged by his confidence in the future of gas, but he reminds us of the keen competition that we shall face during the next two or three years. We know that the problems confronting us today have to be tackled with a sense of urgency.

'Neither Sir Charles's paper nor the communications presented at these meetings attempted to cover all the research work in hand. Much of the work has not reached the stage when the success achieved on pilot plants and the improvements in appliances can be disclosed as ripe for full-scale commercial development'.

They knew that their business would expand only if their prices were competitive with alternative fuels. A cheap fuel was vital to the economic prosperity of the country, and particularly to every industrialist who might have to compete for business in European markets, where the power factor was available at such attractive prices.

Welcoming the principal guest, Sir Harold Roxbee Cox, Mr. Battersby said he had done pioneer work in jet propulsion, gas turbines and problems of fuel and power, and he was a Past President of the Royal Aeronautical Society.

Sir Harold was Chairman of the National Council for Technological Awards and last year was elected a Fellow of Imperial College.

He was more closely associated with the gas industry when he was the Chief Scientist of the then Ministry of Fuel and Power. He was Chairman of the Metal Box Company, and was recently appointed to the Chairmanship of the Research Council of the Department of Scientific and Industrial Research.

Sir Harold Roxbee Cox, said he had long had a very deep interest in town gas, partly practical and partly sentimental. His company used more than 5 mill. therms a year.

Sentimental interest

He had a great affection for town gas because during the last century it kept alive his favourite vehicle—the balloon. His other sentimental interest in gas arose from the fact that coal gas lighting started its serious life in his native city, and very near to where he was born.

'Since those distant days, gas has ceased to be a serious source of lighting, as it certainly was then, but it has become a great source of heat and power. In this role it has, as we all know, powerful competitors—and I am not going to be drawn today into making any invidious comparisons.

'I do say, however, that there are very many circumstances in which gas is technologically the best solution and, further, I believe that it can materially increase its sphere of application.'

Expansion depended on the industry's ability to reduce the price of gas, and their ability to increase the ease of carrying it to wherever it was wanted.

He knew that grids existed in various parts of the

Continued on page 331

From a paper presented to the 27th I.G.E. Autumn Research Meeting, London.

Research in the gas industry

By SIR CHARLES ELLIS, F.R.S., HON.M.I.GAS E.,
SCIENTIFIC ADVISER TO THE GAS COUNCIL.

RESEARCH is concerned with working out the processes and equipment that one hopes to see in use several years ahead, and any new plant that is now being planned and drawn out for installation is probably based on research carried out several years ago and on results from pilot-scale work of at least a few years ago. The gap in time between the inception of an idea and the final realisation in the form of an industrial plant or equipment varies with the size and complexity of the installation, but it is never short; it may be five years for a new stove or burner, it may be 15 years or more for a new method of making gas.

No one can claim to look ahead with accuracy over 15 years, and it might seem a considerable risk that a new process, however successful technically, would find no practical application once it were perfected. Indeed, this happens more often than is generally known, or, rather, would happen if work on the project were not stopped as soon as the danger signals were recognised. The best policy for an industry so large and so complex as ours is to choose some broad objective to work towards and then to keep under constant review the major lines of work to ensure that they are co-operating to the attainment of this objective.

Total gasification

The Gas Council has decided that its major effort in research shall be directed at total gasification to produce a gas of the highest purity and lowest cost.

The question of cost should, according to current thought, be considered in relation to the following requirements:

1. The ability to use any available solid, liquid, or gaseous fuel as the raw material for gas manufacture so as to take advantage of the market conditions ruling at the time.

2. The ability to effect the conversion of such raw material to finished town gas at an overall cost not greater than 2.5 times the cost per therm of the raw material.

3. To effect the conversion in plant whose capital cost is sufficiently low for it to be operated at the low load factor associated with domestic space heating.

Cost is coupled with purity in the directive, and these two points are fundamental to the policy of the Council's research on utilisation. While the phrase 'cost to the consumer' is usually taken to mean delivered cost, that is, the cost of production and transmission, in the wider sense it also involves what the consumer must expend on appliances and what efficiency of utilisation he obtains for this expenditure. Both of these are closely dependent on the purity of the gas.

Reduction in the organic sulphur compounds remaining after normal purification could with advantage be taken to a figure as low as about 2 gr per 100 cu.ft., when appliances could be designed for use at higher efficiencies, and troubles due to corrosion would virtually not occur.

Reduction of carbon monoxide is also classified under purification, and the Council has recommended to the area gas boards that new plant should provide gas with a carbon monoxide content below 10%.

Both of these improvements in the quality of the gas would be welcomed by the consumer, but, although it is hoped they would lead to a greater popularity for gas, their cost could scarcely be met by increasing the price. The quite considerable cost of installing and running plant to give these improvements on existing streams from conventional gas-making systems might add about 1d. per therm to the running costs of the complete process. If, however, the purification processes were 'built-in' to the new gas-making process, it might well be possible to achieve improved purity without additional overall cost: For example, the cost of carbon monoxide conversion could be more than counterbalanced by the fact that the conversion would allow the introduction of a ballast gas and the use of more enrichers.

The only method of reducing the carbon monoxide content of gas which is worth consideration on grounds of cost is the water gas shift reaction in which the carbon monoxide reacts with steam over a catalyst to give hydrogen and carbon dioxide. Subsequently, part of the carbon dioxide is removed by absorption using one of a number of methods. The simplest case is the shifting of lean gas, using iron oxide-chromia catalysts. This process would be applicable not only to the new types of gas, but also to existing gases, such as, for example, carburetted water gas. With clean gases the catalysts age slowly and the only side reaction, that of methane synthesis, can be prevented by a small excess of steam. A practical problem that serves to illustrate and define the field of research is that of gas at about 20 atmospheres from the Lurgi process.

Pilot-scale tests

The Steinkohlengas Company of Dorsten has recently been experimenting on the pilot-scale by reacting the crude gas from the gasifier over a molybdenum sulphide catalyst before the removal of water vapour, light oils and hydrogen sulphide. It is claimed that it is possible with one single catalyst to effect the water gas shift reaction, hydrogenation of sulphur compounds and the hydrocracking of hydrocarbons. Several advantages appear to attach to this process: It economises in steam and heat exchangers, improves the quality of the light oil by desulphurising it and reducing the unsaturated hydrocarbon content, increases the production of benzole at the expense of tar, and reduces the volume of effluent liquor and the proportion of polyhydric phenols in it, but, so far, all knowledge is of an empirical nature. The Gas Council has, therefore, decided to arrange for a careful study of the chemical reactions involved, the investigation of a number of different catalysts and the effects of adding to carbon monoxide, hydrogen and steam,

a proportion of contaminant such as hydrogen sulphide, benzene, thiophen or *n*-heptane. This work is estimated to take about three years to complete at a cost of £40,000.

Reducing the carbon monoxide to about 5% results in a carbon dioxide content of 30 to 40%, and this has to be reduced to ensure satisfactory combustion characteristics. Precisely how much can be left in depends on each individual production unit, and it can well be advantageous to remove more carbon dioxide than theoretically necessary for obtaining correct combustion characteristics and replace it by nitrogen as a ballast gas, since this permits the addition of more of the cheap enriching therm, which might well result in counterbalancing the extra cost of this part of the process.

There are many commercial processes available, such as the Rectisol and Fluor processes using organic solvents for the carbon dioxide, and processes using alkali as the absorbent, but there are still several important points on which the lack of fundamental information makes it difficult to ensure the best design for each particular case.

The absorption of carbon dioxide is controlled by a slow chemical reaction, so slow that there is scope for evolving cheaper methods, which might be variants of existing methods. This work has now been started at the London Research Station and is expected to take about four years and cost a little under £140,000.

More ambitious project

A more ambitious project, involving much more exploratory research, is to find one single process for removing hydrogen sulphide from gases at 20 atmospheres in the presence of considerable quantities of carbon dioxide. The traditional iron oxide method is not suitable for the main absorption, since the pressure prevents the evaporation of water formed in the reaction, while liquid processes currently used involve a multiplicity of steps.

It appears that, both at Westfield and at Coleshill, removal of the greater part of the hydrogen sulphide by reversible absorption in an aqueous wash liquor must be followed by secondary purification using iron oxide in pressure tower purifiers, and there still remains the problem of converting the hydrogen sulphide from the primary purification systems, much diluted with carbon dioxide, to sulphur or sulphuric acid. It is obviously an important objective to search for a single process that will remove all the hydrogen sulphide with the production of sulphur sufficiently pure to be saleable. A thorough study of possible oxidation reduction systems working at pressure will take at least four years and, including pilot plant, the cost may well approach £150,000.

The Stretford process, using anthraquinone disulphonate, has been developed for removal of hydrogen sulphide at ordinary pressures, and a pilot-scale study of this process applied to gas at high pressure is being carried out in a plant at Sydenham works. It will provide practical operating experience, and will, where necessary, be supplemented by laboratory investigations.

The successful commissioning at Westfield of a Lurgi plant demonstrates the technical feasibility of using this generator on British coals, and constitutes a major advance. It has even been said that the total gasification of coal has been mastered, that all that is now required is to put up Westfield-type plants as fast as possible. This is an important point which cannot be dismissed lightly and to which much serious thought has been given, but, however striking may be the achievement of getting a Lurgi to work on British coals, it can only be considered as a first step. At the present cost of coal, it cannot compete with some oil-based processes, and the very heavy capital requirements are unattractive in view of a possible trend to lower load factors. The Gas Council feels, therefore, that research on total-gasification processes using a variety of feedstocks must be pushed in order to broaden its knowledge of future possibilities.

The early experiments on operating a fixed-bed gasifier under slagging conditions were undertaken with coke and at only 4 atmospheres, but these were capable of showing the improvement resulting from working at a higher bed temperature. It was possible to estimate the comparative performances for a typical high-volatile, weakly caking coal under both slagging and dry ash-removal conditions.

Estimated performances for a typical high-volatile weakly caking coal in a slagging gasifier compared with that obtained in a gasifier with dry ash removal, sufficed to bring out the differences between the dry ash- and slagging-type generator. Much less steam is used, and this, combined with the higher reaction temperature, results in a smaller production of liquor.

On the other hand, more oxygen is used. In the crude gas from the dry-bed gasifier, there is 28% of carbon dioxide, but only about 6% in the slagging type. This will facilitate the removal of sulphur compounds at an early stage of gas treatment, and hence, also, the removal of the carbon dioxide produced subsequently during carbon monoxide conversion. When it is remembered that well over 2d. a therm can be involved in reducing carbon-monoxide and removing carbon dioxide and sulphur compounds, it is obvious how important are any factors that affect these operations. The Committee on Coal Derivatives (the Wilson Committee) considered that it might prove to be somewhat more expensive to transform raw gas from a slagging gasifier into town gas than to do so for raw gas produced by a conventional Lurgi gasifier, but, weighing up all the factors of effluent disposal, greater specific throughput and ability to use a greater variety of coals, it recommended that this development should be pursued.

The experiments at the Midlands Research Station on the slagging gasifier have now reached the stage where the gas output will be about 5 mill. cu.ft. per day, and corresponding supplies of fuel, steam and oxygen will be needed.

An alternative to a fixed-bed coal gasifier is to maintain the coal in a fluidised state by the reacting gases. This system is also under investigation at the Midlands Research Station. One of the difficulties that it has encountered is to prevent sintering of the ash in the coal, and the only practicable method of doing this is to limit the reaction temperature to about 1,000° C. Unfortunately, this has an adverse effect on gas output and steam decomposition, and experiments are at present mainly directed to overcoming this difficulty.

Long way to go

This research has still a long way to go and at present has to give way to more urgent problems. It seems unlikely that pilot-scale work will be completed before the end of 1965.

To complete this account of experiments on the total gasification of coal, a brief reference must be made to the investigations at the London Research Station, of the Otto-Rummel double shaft slag bath. This operates at ordinary pressures and is being erected as a pilot plant, of 2 mill. cu.ft. per day, by Simon-Carves, which holds the licence from the German firm of Otto. The gasifier consists of a single annular bath of molten slag surmounted by two shafts. The coal to be gasified is injected with steam into the slag at the bottom of one shaft. The gas produced consists of a mixture of water gas and highly

cracked carbonisation gas. The slag, in which some carbon may remain entrained, is kept in circulation by the action of the injector, and passes under a curtain wall into the area under the other shaft. Here, air is injected into the slag and burns with any entrained carbon and with added fuel as necessary, thus restoring the temperature of the slag before it circulates back to the gasification zone. The size of a production plant could be quite small and suitable for using a moderate supply of local cheap coal. This system is therefore complementary to Lurgi which must be served by an economically large size of oxygen plant and must be sited near a very large supply of cheap coal.

Starting from crude or heavy oil as a feedstock, the hydrogenation reaction is well-known. The oil already contains a fair quantity of hydrogen combined with carbon, and the object is to add more so that in principle methane results. This reaction is exothermic and its practical realisation poses acute chemical engineering problems. An extremely ingenious way has been worked out of controlling the reaction by using the oil and hydrogenation gas to fluidise a column of coke which is continuously circulating by return through a non-fluidised downcomer. The fluidised coke bed ensures a controllable, even distribution of the exothermic heat besides giving a large surface for reaction.

On Iranian crude oil

A pilot plant operating at 1 mill. cu.ft. per day has been built. After extensive experiments on light oils, it was run early this year on Iranian crude oil making gas of 800 B.t.u. per cu.ft.

On a full-scale plant, it is possible that the higher aromatics would be returned for further hydrogenation to gas, benzene and naphthalene. This experiment, while showing the need for some further modifications in design, gives great promise of success.

When this process is to be used to enrich shifted gas from a coal-gasification plant, it will be necessary only to send part of the hydrogen-rich gas stream through the hydrogenator. It would appear that approximately 1 ton of oil is required to enrich the gas produced from 5 to 6 tons of coal.

In view of this good progress, the enrichment of the gas obtained from the total gasification of coal seems to be reasonably safeguarded, either by the purchase of refinery gases, by imported methane, or by the manufacture of rich gas by hydrogenation of light distillate, or crude oil, but as yet the Gas Council considers it should also fully explore the possibilities of obtaining a source of enrichment based on coal. The possibility of this rests on Dr. Dent's investigations into the hydrogenation of coal. Dr. Dent discovered this reaction many years ago, but its exploration as a practical means of making gas from coal involved not only the solution of some very difficult engineering problems, but also the recognition that the reaction consisted of two stages, the existence of which is probably due to basic features in the structure of coal.

The temperature must be high, and probably over 900° C. when, and as Dr. Dent points out, the highest concentration of methane is severely limited by close approach to the equilibrium conditions. So, to achieve a 600-B.t.u. per cu.ft. gas by a one-stage process might require pressures of 70 to 100 atmospheres. Such pressures might prove to be inconveniently high, and a way out would be to gasify in two stages: The first, at about 800° C., to hydrogenate the volatile matter, providing a very rich gas, thus making it possible to run the second stage at 900° to 950° C. at only 25 to 50 atmospheres so that this age would now be making gas of lower calorific value on .

To complete this picture of the pattern of research i the gas production field, mention must be made of a pr cess for the production of town gas by the catalytic intera ion at high pressure of light distillate and steam. The pr cess consists, broadly, in reacting steam with light distilla at relatively low temperatures over a catalyst to produ e a methane-rich gas which is then reformed to town gas t a higher temperature generated autothermically by the addition of air.

The process was initially designed to minimise capital charges for peak loads, but it is now attracting attention for use on base load. Operation is at the high thermal efficiency of 85% and plant units can be of very high output. It has now reached the stage where full-scale plants could be designed.

The current programme on utilisation contains many examples of equipment with performances that would not have been considered possible a few years ago.

One outstanding development is the common flue for a number of different appliances. It is no exaggeration to say that but for the success of this work the use of gas in large multi-storey buildings would have been severely restricted.

The first step was the adaptation of appliances to the already known balanced-flue principle. Work on the shunt flue and twin common flue led to the development of the U-duct, in which the two flues were joined at the bottom. Further work showed that balanced-flue appliances could tolerate a substantial degree of vitiation of the air supplied to them. Furthermore, in order to meet objections raised on aesthetic grounds, a system whereby the terminals of the flues were vented into a ventilating chamber which was itself ventilated to the open air at some convenient point in the structure, was developed. With the ventilating chamber vertical instead of horizontal, and open at the top and bottom, the system worked far more satisfactorily than had been expected. Aerodynamic mathematical studies of the system were undertaken, and the result was the SE-Duct, which is now fast winning the favour of architects.

The system has proved to be aerodynamically stable over periods of storm and with winds up to 80 m.p.h. The latest developments include a study of mechanical extraction, with particular reference to the attachment of incinerators to common-flue systems.

Under field conditions

A continuing and important field of enquiry is to investigate the performance of appliances under field conditions in order to collect dependable data on fuel consumption, and especially to contrast the cost of whole-house heating with the use of individual fires.

Field tests on actual houses are carried out extending over several heating seasons, and these are supplemented and their interpretation simplified by measurement in a test house.

In the field of appliance design, important advances have been made in gas fires. The newest type of fire contains the large heat exchanger and substantial convection output of the normal convector fire, but the radiating elements have been totally enclosed to avoid dilution of the products of combustion in the heat exchanger. This arrangement results in an increase of convector efficiency and also provides an enclosed appliance that can be used with the common flue of a multi-storey building. To retain the substantial radiant output of the fire, the radiat-

ing elements must be enclosed by a transparent or translucent window.

To obtain the optimum performance from a fire, its efficiency must be maintained irrespective of flue draught. Two methods of overcoming the effects of flue draught have been devised. In one, the flue draught is balanced by taking air for combustion from behind the fire, a method that has the advantage of being adaptable for hearth, common-flue and balanced-flue use, but the method does require a high standard of sealing. In the alternative arrangement, the combustion air intake is normal, but is fitted with a draught diverter. Here the standard of sealing need not be so stringent, and the appliance is therefore simpler and cheaper. It is suitable only for hearth use, however.

Prototype fires of both types have been constructed and tested in the laboratory and on the district, and efficiencies of 75% have been obtained which were virtually unaffected by flue draught. It is interesting to note that, allowing an efficiency of 70% for the production of gas by total gasification of coal, the efficiency of this fire of 75% means that the consumer is using the available heat in coal at the remarkably high efficiency of over 52%. Moreover, the transmission of the energy as gas is cheaper than the transmission of electrical energy.

A greatly improved type of instantaneous continuous water heater is now on field trial over the whole country. Control is exercised on the volume of outflow so as to maintain the temperature constant independent of water inlet temperature or any other variable, a performance unique to gas.

It may be well to recall that the likely type of new gas will be similar to that from an enriched, shifted Lurgi-like gas with carbon monoxide content less than 10%. The main adjustable parameters in respect of any one particular gas are: The amount of carbon monoxide finally left, and the ratio of carbon dioxide to nitrogen used as non-combustibles. The proper choice of these will be important in the economics of the overall process, and a decision can only be made on the basis of a full study of the combustion characteristics of all gas mixtures falling within the group determined by acceptable calorific value, Wobbe number and flame-speed.

Utilisation programme

The research programme on utilisation includes several projects on the industrial uses of gases, and in this field the problem of burner noise is one of the more important, since all high-capacity burners are to some extent noisy. Two main types of noise can be distinguished: A loud roaring noise usually occurring when the burner is operating unenclosed, and a noise of a definite pitch, usually produced by burners operating in combustion chambers. The loud roaring noise may be termed 'aerodynamic' noise and covers all forms of sound generation by turbulence, such as jet noise or edge tones. Valuable research on this is being carried out in an attempt to understand what parameters affect this noise and how it may be suppressed. This jet noise is not characterised by one or more discrete tones, but consists of a broad band of frequencies ranging from subsonic to ultrasonic.

High-velocity tunnel burners, which are becoming increasingly important in industry, can produce a high-pitched noise of such great intensity as to militate against their use in some applications. The sound is emitted in a small number of sharply defined frequency ranges and this has suggested that it arises in a somewhat analogous manner to that from a blown organ pipe. It has now been shown how the oscillations arise and how to disentangle the additional complications of standing-waves in the mixture-supply pipework. At the same time theories were put to practical test, and high-intensity tunnel burners were designed to be as quiet as possible. It seems inevitable that a high-intensity burner will be noisy, but it makes all the difference to the extension of its use in industry if the noise is under control and is known to be kept, by proper design, to the lowest possible level.

The Gas Council has in mind starting a new group on basic research.

Some basic research is being done at each of the Council's three establishments, and figures largely in the work at the University of Leeds under the Livesey Professor, Dr. A. L. Roberts. In addition to the investigations of the noise of flames to which I have referred, his team is carrying out important investigation on the detailed mechanism of combustion. However, the Gas Council considers that this basic research work must be increased and in a way which, while keeping it in close contact with the industry, will yet protect it from disturbance by the intrusion of immediate development problems. It is too early to speak about the programme of the Group, since a scientist has only just been appointed as Head of the Group. His first task will be to think widely about the future of gas and to try to identify a few lines of research that have a reasonable chance of breaking new ground. I am confident this can be done, and indeed, now that the Council has taken this decision, I am less worried about 1974 than 1964.

DISCUSSION

Mr. G. U. Hopton (Director, London Research Station), said methods were known and practised for the treatment of gas by reduction of carbon monoxide content, and removal of carbon dioxide and hydrogen sulphide, but there was always room for improvement.

Some of these claims, such as shift treatment of hot crude gases, should be confirmed by tests on gases which were believed to be difficult to treat, such as carburetted water gas and oil gas from cyclic catalytic gasification.

Moreover, an understanding of the behaviour of catalysts might lead to further improvement which would otherwise be missed.

Many purification processes now in operation were expensive; for example, the cost of removing carbon dioxide from Lurgi gas by the Benfield process had been given as 1.1d. a therm.

In the course of the operation of a Lurgi plant with an output of 30 mill. cu.ft. a day for 300 days a year over 20 years, carbon dioxide removal therefore cost over £4 mill. There was considerable scope for saving which justified the estimated expenditure on this research project. Indeed, all new projects must be so justified before approval by the Research Committee.

In carrying out this programme they were very pleased if they could collaborate with other workers. He wished that more co-ordination in research was possible with contractors, but he realised the difficulties where patents and 'know-how' were concerned.

He would like to conclude by a few words on the slag bath generator. This process, unlike the Lurgi process, did not require graded coal or oxygen. A small pilot plant was used in a very short run by the inventor at Wesseling. It made a gas contaminated with much nitrogen and at low efficiency.

The project at Bromley was, as the Chief Scientist of the Ministry of Power wrote in a recent paper, 'a good example of the sort of long shot we must be prepared to undertake if we are to achieve worthwhile technological advances.'

It had to be done on the scale of 2 mill. a day because anything smaller would have prejudiced the experiment,

since the heat losses would be inordinately high and the length of travel of the slag would be too short to permit disengagement of gases before the slag crossed the curtain into the next compartment.

He could only hope that their courage would be justified by the results.

Mr. L. W. Andrew (Director, Watson House) outlined the method of operating the programme at the Watson House Research Station and emphasised a number of points of particular importance.

He felt that because of space limitations, Sir Charles had not given a fair crack of the whip to research in the use of industrial gas. This was such an important project, and it was fundamental research which was playing such a great part in industrial gas, where the gas engineer had to deal with a vast variety of processes on which he needed fundamental information.

In the paper industrial gas was quoted by the example of noise, which was important, but not as important as some other items, and the rest of industrial gas was put in the conclusion. He would like that strengthened.

At Watson House

At the Watson House Research Station the work on research, as defined as specific projects approved by the Research Committee of the Gas Council, represented in manpower nearly half of the total work at Watson House.

The other half was on testing and development for the Watson House Centre. Of the research work, something like one-third could fairly be defined as fundamental, whereas the other two-thirds was intended to aid short term development.

When they moved to the new laboratories in the New Year, there would be more physical separation of the research team from testing and development work, but it was their intention that research, development and testing should be carried out in the same laboratory with one person responsible for all aspects of a particular heat service or a particular activity.

It was believed that this arrangement was to the advantage of all concerned—in terms of efficiency and interest.

He hoped it was clear from Sir Charles' paper that the scope of research on utilisation did not stop with the design of better appliances but included their use in practice in the most effective manner.

From both laboratory and field work they must know their own strength more clearly, and have the evidence which would convince individuals and important authorities.

It was not enough to say 'Gas is best'; they must know why and be able to prove it by real figures.

It so happened that the four papers from Watson House Research Station at that meeting were in themselves examples of the type of research being undertaken, and its value. The first was 'Domestic heat services in occupied houses.'

This paper considered the results of extensive field trials throughout the country in which heat services by gas and solid fuels using first-class installations were compared on a proper basis. It provided data which could stand up to criticism and comment by independent authorities.

The second was 'Flash tube design.' The work here dealt fundamentally with the ignition of gas appliances, particularly cookers, by means of a flash tube. It was in effect, removing an important part of ignition from an *ad hoc* basis of design to a scientific one.

The third was 'Forces in meters.' Here again, the problems of accuracy of registration and measurement of gas at low rates had been considered fundamentally through a detailed examination of the forces involved in the operation of each of the components of a meter.

This better understanding of what was happening in a meter should lead not only to general design improvements but also to an appreciation of the relative priority of various design features.

The fourth was 'Development in industrial gas utilisation on the Continent.' This paper gave some idea of the stimulus resulting from discussions with research and development people outside Great Britain, and also emphasised the value of personal contacts with those interested in similar problems.

There was three other comments he would like to make. First, Sir Charles spoke of the co-ordination of the work on utilisation with that on manufacture, and he would like to emphasise the importance of this and express his appreciation of the co-operation which now took place.

It should be realised that such factors as the carbon monoxide and sulphur content of the gas, as well as the whole question of combustion characteristics as they were now and might develop, affected the pattern and priority of their research now and in the future.

Secondly, he would like to emphasise the great value to them as research workers, and to the industry as a whole, of their contacts with such bodies as the Building Research Station, the Heating and Ventilating Research Association, Development Groups of the Ministries, and corresponding bodies in the United States of America and on the Continent.

The quality and integrity of their research work must be such that it was fully accepted by these organisations. He believed this was true and the value of such contacts could hardly be over-emphasised, not only as part of the total available effort to provide better services for the user, but also because such contacts enabled gas to be placed in its correct position in relation to other fuels, not only immediately, but also in relation to future hopes and plans.

Finally, he would like to emphasise the value of sponsored research and of their relation with the universities; for example, at the moment their contacts with Cambridge, Leeds, Sheffield and Battersea not only produced results valuable in themselves, but proved most stimulating to the staff through discussions with those carrying out the work in the atmosphere of a university.

15 years too long?

Mr. C. Ryder (Process Development Chemist, South Eastern Gas Board), said that Sir Charles Ellis mentioned that 15 years represented a reasonable time for the development of a new method of making gas. By its very nature the gas industry was cautious in its attitude because it could not take any risks which would endanger the supply or utilisation of gas, and this was how it should be. He asked whether 15 years was too long a period to prove a process.

The accepted path of development was a very tedious one passing through the stages of laboratory, bench work and pilot plant, semi-scale pilot plant, prototype large-scale plant and final acceptance of the process as reliable. How was this time to be reduced?

Without doubt the fundamental laboratory work should be very carefully planned and weak points in the project thoroughly investigated separately. Time spent at this level would be repaid at a later stage of development and might avoid delays on the large plant.

A brief pilot plant run should be necessary once the project had been proven on the laboratory scale to ensure that the initial practical application of the process was

feasible and provide the basis for the design of the large-scale prototype.

In his opinion, the next stage was where the delay occurred; it was far better to treat the prototype or large-scale pilot plant as an actual process unit on a gasworks. It was found that, on a gasworks, provided one had chosen wisely, there was the will and driving force to make a plant work and such difficulties as was encountered were overcome as quickly as possible.

Perhaps that solution to the difficulty was not the best one, but it had been solved and the process made to work; improvements and refinements were made when convenient at a later date.

The experiments carried out on such a plant should be logically planned, and such changes that were made to establish a point should be made one at a time, and the effect of the change examined before proceeding to the next move. He could assure them there was a great temptation to make more than one move at a time.

The second point concerned communications or the exchange of information.

Development work

The Gas Acts stipulated that the Gas Council was responsible for research on behalf of the gas industry, but most of the area boards carried out development work on one project or another; an example of this was oil gasification.

The Institution and the Junior Gas Associations did provide forums for the interchange of ideas, but no one really liked to air their dirty linen in public, and if one had slipped up on a particular project there was a natural disinclination to tell other people, but it was just the information regarding the causes of failure which could be so useful and help other people to avoid the same pitfall.

Perhaps the Institution might consider the setting up of a Development Committee where full and frank discussion of such projects could take place?

He thought it was too much asking a research unit to both develop a process and then prove it on a large scale, and although there did exist a risk that the process might fail on the large scale, the gas industry was large enough to take those risks and thus speed up the application of a new process.

Professor A. L. Roberts (University of Leeds) said Sir Charles had dealt with the highlights of the research programmes, but in the programmes there were a large number of items with which he could not deal. He mentioned 157. Many of these were essential ancillaries to the major projects.

Some of them might well not see the light of day, not because they were technically unsuccessful but because it might be found that economics prevented the exploitation of the processes. All engaged in research could point to disheartening examples of that kind of thing, but such researches, even when there were economically poor results, at least gave basic information.

He was interested in Mr. Andrew's point about industrial gas. He intended to make this point and might still do so from a different angle. He thought that Sir Charles' admirable review of research could be added to by including the efforts of the industrial gas centres throughout the country.

Their work was perhaps not research in the terms about which they were speaking at the moment, but at least it was excellent development work.

They went into the forefront of the battle looking for new exploitation of gas and taking advantage of the very merits of gas which Sir Charles described towards the end of the paper.

They were doing a first-rate job, particularly in feeding back to the boys in the back room essential information on which they had designed their future researches, which might have far-reaching consequences.

The case of noise, which Sir Charles mentioned, as arising from combustion, was one in point. It arose from the industrial gas centres originally. He suggested to Sir Charles that in considering his balanced pattern this might be more extended by including the work of the industrial gas centres.

Basic research was a matter of great interest to the Joint Research Committee, which for a long time—starting over 25 years ago—had been charged with this very thing. He did not think that anyone questioned the need to extend basic research in the industry.

Sir Charles had given a clear picture by implication of the co-ordination which existed in the research in the gas industry today. The Joint Research Committee had made a special plea, which had by no means fallen on deaf ears, that co-ordination should be effective at the highest level between the new basic research group and the Research Committee at Leeds, as with all other research stations.

Mr. J. E. Davis (Chief Technical Officer, South-Eastern Gas Board) said there was a remark about the work which had been done on the Stretford process at Sydenham. That came from the North Western Gas Board. It just happened that the Gas Council had provided the money for the building of a high pressure gas purification plant at Sydenham, and they wanted to see how far they could go.

He was not going to say anything yet, but he hoped that before long they would be able to see how far the plant would do its high pressure job.

Reference had also been made to the work on flues in co-operation with Watson House and the Old Kent Road Laboratory. The names to be associated with it were not important now, but they had already heard from the people who had brought it into existence, and how they had done it. He was in a position to say what a good piece of work it was.

One point that he would like to stress was the difficulty of defining a problem and thereby getting an idea which formed the basis of work.

For that reason, he was glad that reference had been made to the discussions which took place between the various centres in the industry where research was being done so that they each knew what the other was doing and could speak quite frankly if they thought it was not good enough and if they thought that they ought to do it another way.

Frank criticism

What it amounted to was a very friendly and frank criticism of ideas. Indeed, it was the only way to keep the ideas on a line.

It was very important, because their particular laboratories at Old Kent Road were two-thirds service organisation and one-third of the work was Gas Council research. They had to serve a lot of people.

There was the matter of the raw materials that they bought, and also the stores. There were also the gas production side, the distribution side, the coke manager's side, the chemical production manager's side and the very important sales and service side.

All these brought problems to a very small staff. They were nearly all problems for which an urgent solution, and also a common sense solution, was needed. It was a very good training ground indeed on which to build something of a research effort.

As to their attitude towards research, he saw in this a

very real relation between what the industry needed and what the research men were trying to give it, and that was the point which Sir Charles Ellis had brought out so admirably in his paper.

Dr. F. J. Dent (Director, Midlands Research Station) said he was delighted that Sir Charles, in adopting total gasification as the theme of his paper, had been able to say that it now coloured most of the Gas Council's research.

It was in keeping with the determination to sell more gas, and, clearly, this depended as much on utilisation as on production processes. Gasification was no longer synonymous with activities at Solihull.

At Solihull, the programme of gasification research was, in essence, the development of a series of pressure processes, to produce gas from the range of raw materials available, characterised by the plant units having large specific outputs, and making gas of high quality, at minimum cost.

Most features included

Included were most of the features which had been called for at various times from that platform: Gas free from sulphur and gas low in carbon monoxide; gas of the same quality irrespective of the raw materials used; gas of the same quality from both base load and peak load plants; to be able to use low grade coal and any type of oil according to cost; and to reduce costs still further by using plant units of high capacity with pressure available to help distribution.

The programme had crystallised into seven main projects. With some regard to present priority, these were: The catalytic gasification of distillate; the hydrogenation of distillate; the hydrogenation of crude and heavy oil; a slagging gasifier for coal; a pressure reformer for gaseous hydrocarbons; the hydrogenation of coal; and, finally, a fluidised gasifier for small coal as well as for the power residues from coal hydrogenation.

At first sight this appeared to be a mammoth programme and, in fact, it was. So far as he knew it was unique in the sense that no one had previously attempted the development of a series of matching processes, covering a range of raw materials, with a view to attaining a commanding position regarding the production and handling of gas in bulk.

The amount of work involved was all the more imposing since, to meet all requirements and, particularly, when these were bracketed with minimum cost, many of the techniques were quite new. On the other hand, the programme seemed more manageable in the light of two considerations.

The first was that, since each was a major project, there was no need for them all to be made available at once—the industry could not digest them if they were.

They could be launched successively with established processes such as Lurgi and Shell, now fortunately to be supplemented with methane, paving the way.

The second consideration concerned the research effort needed. Here, it was true to say that there were many points of similarity between the various pressure processes and, as a result, one would expect the work to gather momentum as it proceeded.

That, in fact, was what was happening and, after the initial construction period, he thought they could now look forward to an increasing flow of results.

The present position of the seven projects was as follows: Two of them, the catalytic gasification of distillate and the hydrogenation of distillate, were almost through the pilot plant stage. This was being completed by runs of a month's duration, now in progress.

Pilot work on the third process, the hydrogenation of crude and heavy oil, was also approaching completion although, in this case, there might be more work on the development scale where corrosion problems might appear.

On the slagging gasifier there had been a break-through at least at the slagging end and they would soon be well equipped to tackle the problems of gasifying coal. They had used coke so far.

The pressure reformer for gaseous hydrocarbons was under construction after preliminary work.

There was now a great deal of background information on the hydrogenation of coal and, while trial runs in the plant called for modifications, they did not give rise to concern.

Finally, model experiments which would determine the design of a fluidised gasifier were well under way.

Thus, all the projects were moving, some more advanced than others, according to their priority. As yet no insurmountable difficulty had been encountered and, at the moment, potentialities seemed likely to materialise.

Sir Charles Ellis, replying to the discussion, said that what was said by Mr. Andrew was very sound indeed. That was an example of constructive criticism. The penny had dropped, and he fully appreciated his point. What he said should have been done.

He thought that Mr. Ryder put his finger on the spot about this being an awfully long gap and that the sphere in which they should hurry it up most was in development. He wished him luck in that. He did not know how many people had tried it. It was not an easy point to tackle, but he was right to try to do it.

Professor Roberts had said that there should have been stronger references in the paper to the important work of the industrial gas centres. He took that point. He was sure he was right. Incidentally, that joined on to what Mr. Davies said. He referred to the need to define a project.

Once they had defined the problem and made it clear that there was a problem to solve, the actual doing of it was not usually so difficult. Most failures were due to not tackling a problem or to tackling what was imagined to be a problem but it later dissolved in one's hands and showed that it was not worth the attempt.

He was grateful to Dr. Dent for his remark about time scales.

The President expressed thanks for the paper and the discussion.

Revised Standard

THE use of compressed air grows each year as more and more applications are found for it. To help this growth, the British Standards Institution has revised and enlarged B.S. 1123, giving specifications for safety valves, gauges, and other safety fittings.

Although the main provisions of the standard remain unchanged, modifications have been made to secure co-ordination with the 1955 edition of revised B.S. 759—'Valves, gauges, and other safety fittings for application to land boilers and piping installations for and in connection with land boilers.' The most important of these modifications is the permissible use of safety valves having an established discharge greater than provided for by the minimum aggregate area formula.

The revision also includes a comprehensive specification covering the requirements for safety valve springs. Copies of the standard cost 4s., and may be obtained from the British Standards Institution, Sales Branch, 2 Park Street, London, W.1.

THE SAVOY LUNCHEON—Continued from p. 321

country, but he felt that the linking of all these and the development of a national system was still a very worthwhile objective.

'It is a great problem—one of the greatest, I suppose, with which you could be faced—and it has its own great problems, like the storage problem, but it has immense potential,' he said.

The changing pattern and the great possibilities which they could visualise must mean an increasing emphasis on research and development.

'You have done a great deal in the past, and you are doing a great deal now, but I feel that the research and development effort will be even greater in the future.

'The present pattern, which Sir Charles Ellis so admirably covered in his discourse this morning, must, I feel, in future become a much greater proportion of your total endeavour. This means that you will want more and more people trained as scientists and engineers, capable of making the developments on which the future of your industry depends.'

The colleges of technology were doing a wonderful job. At the graduate level, there were more than 5,000 people studying for Diplomas in Technology, and 3,500 of these were in the colleges of advanced technology. The numbers were growing.

There was a higher award, which was known as Membership of the College of Technologists—the M.C.T. It was announced two years ago. It was quite a new thing and was thought of as being academically at the level of a PH.D., but it was, or would be, obtained for a very different kind of endeavour.

The award would normally be made for advanced work which was carried on jointly in industry and in a college, and it might be concerned with any technological aspect of industrial activity—research, design, development, production; and it must be likely to be a useful contribution to technological knowledge.

'We think of it as a solid piece of work, because we expect people to take at least three years over it. You will see, therefore, that the M.C.T., this new higher award, ought to be the mark of a first-class investigator. I hope that the gas industry will find many opportunities for its people to work for that higher award.'

He was particularly pleased to discover quite recently that the industry had already one man working for it. He was on a thermodynamic investigation associated with the Midlands Research Station and with the Birmingham College of Advanced Technology.

As Chairman of the D.S.I.R. he wanted to say that the success of their efforts was very dependent on the success of the Department's collaboration with industry. Were their relationships with the Department close enough, and were the Department's relationships with their industry close enough? He doubted it. He did not impute blame to their scientists and engineers nor to D.S.I.R.'s, but he did say categorically that nothing but benefit could follow from closer contacts and more contacts than they had today.

'The possibilities for gas which are ahead of us are such that in some of your projects, the stations of the D.S.I.R. must have some contributions to make, not necessarily only at the basic end of the spectrum, but at the development end as well. I invite you to get all you can out of the D.S.I.R. in the short term and in the long term.'

After Mr. Battersby had expressed his thanks Sir Henry Jones (Chairman, the Gas Council) Past Pesident and Honorary Member. proposed the toast 'The President,' and said of a national grid that he believed they would see one, in addition to the methane main which was already planned.

'But if we have a national grid, it will not be as a symbol of some kind. It must be a grid to do an honest job of work and make gas cheaper for everybody. On that basis, I believe that one day we shall see it.'

The President was a remarkable man from whom they had never lacked wise advice. He was a man of considerable modesty. He never talked of his achievements, but if he said that he would do something, you could forget about it, because you knew that it would be done, and done properly.

Mr. Battersby, in response, said he would like now to say publicly how much he owed to Sir Henry's father. They were lucky in the industry today to be working for his son, Sir Henry Jones.

BOOK REVIEW

GAS FACTS

THE American Gas Association now has copies of the 1961 editions of 'Gas Facts' and the 'Gas Data Book.'

The former publication presents comprehensive information on all phases of gas industry operations during 1960 and earlier years. Included are tabular material on energy reserves, natural gas production, exploratory and developmental drilling, transmission and distribution, underground storage facilities, customers, sales and revenues, appliance shipments, new security issues, financial results, construction expenditures, employees and payroll, the cost of gas and other competitive forms of energy, and a review of the Canadian gas industry.

The 'Gas Data Book' is a condensed, pocket-sized version of 'Gas Facts' presenting the most important statistics of the industry for ready reference.

The new edition of 'Historical Statistics of the Gas Industry' is a 500-page complete compilation of all available statistical information for all years up to and including 1959. It thus brings together in one volume complete historical statistics.

Supplements to 'Historical Statistics of the Gas Industry' will be distributed annually to all purchasers to keep their volumes up-to-date. To facilitate their insertion the new edition will be offered in a post binder.

AMERICAN GAS ASSOCIATION

FINANCE FOR TWO METHANE SHIPS WILL BE RAISED IN CITY

NEWS SUPPLEMENT

PROVISIONAL arrangements have been made for the raising in London of approximately £10,000,000 for the purchase of the two vessels and specialised equipment which will bring liquefied methane gas into the U.K.

The money is being raised on behalf of two ship-owning companies, which will be Conch Methane Tankers Ltd., a subsidiary of Conch International Methane Ltd., and Methane Tanker Finance Ltd., a company associated with the Houlder Brothers Group of companies.

In accordance with what is becoming almost standard practice in the City, the money raised will be repaid over the life of the charter.

The Banks will provide that part of the finance which is to be repaid in the earlier years, and Insurance Companies will mainly provide the longer term finance.

The two vessels will be built by Vickers-Armstrongs (Shipbuilders) Ltd., and Harland & Wolff Ltd. They are expected to be delivered in December, 1963 and June, 1964.

The ordering of these two large vessels is the culmination of development work originated by Mr. Wood Prince of the Union Stockyard and Transit Company of Chicago and continued by Conch International Methane Ltd.

Conch International Methane Ltd., is owned by Canadian Shell Ltd., Continental Oil Company and Union Stockyard and Transit Company of Chicago, and British Methane Ltd., is owned jointly by the U.K. Gas Council and Conch International Methane Ltd.

Gas Council at Building Show

SPACE HEATER SALES RISE

GAS space heater sales were 43% higher than in the previous year in the quarter April-June, 1961. Sales of cookers were only 1% less than a year ago, but water heater sales fell by 13%, and refrigerator and laundry appliances by 8% and 20% respectively.

Total sales of gas (from meters read) were slightly higher than sales in the corresponding quarter of 1960. Sales to industrial consumers were almost 2% higher and domestic sales were ½% higher. Sales to commercial and other consumers fell by nearly 4%.

Gas production was slightly lower, but the quantity of gas purchased increased by 7%, so that total gas made and purchased increased by over 1%.

ANOTHER FUEL, POWER SHOW IN 1963

THE Northern Exhibition of Fuel and Power for Industry—in future to be known as the National Exhibition—is to be held again at the Queens Hall, Leeds, in the Autumn of 1963.

This was the unanimous wish of the exhibitors after a discussion. It was felt that the show must continue—on a biennial basis—to meet a very real need in the industry. Leeds was accepted as the ideal venue and the Queens Hall itself as the ideal setting.

Details were revealed of substantial business booked and of enquiries from as far afield as Ghana, Malaya, Turkey and Norway.

SAHARA GAS BLAZES

FRENCH and American engineers, including two specialists from a Texas company, who were flown specially to the spot, battled with a massive blazing escape of natural gas at the Gassi-Touil drilling site in the Sahara, 90 miles south of the oil centre of Hassi Messaoud.

The gas had been escaping uncontrollably under tremendous pressure—at the rate of 1 mill. cu.m. to 3 mill. cu.m. a day—ever since the protective crust over the underground deposit was pierced on November 3.

The burning gas destroyed the drilling tower and other installations but fortunately caused no injury to engineering workers.

As the pressure is so great, it seems that the deposit located is much more important than had been foreseen, says *The Times* Paris correspondent.

Introduced at this year's Ideal Home Exhibition, these two bright newcomers from NEW WORLD *attracted tremendous interest and thousands of enquiries from Press and Public. The extensive use of hygienic, durable stainless steel, together with other outstanding new features, put them years ahead of any rivals.*

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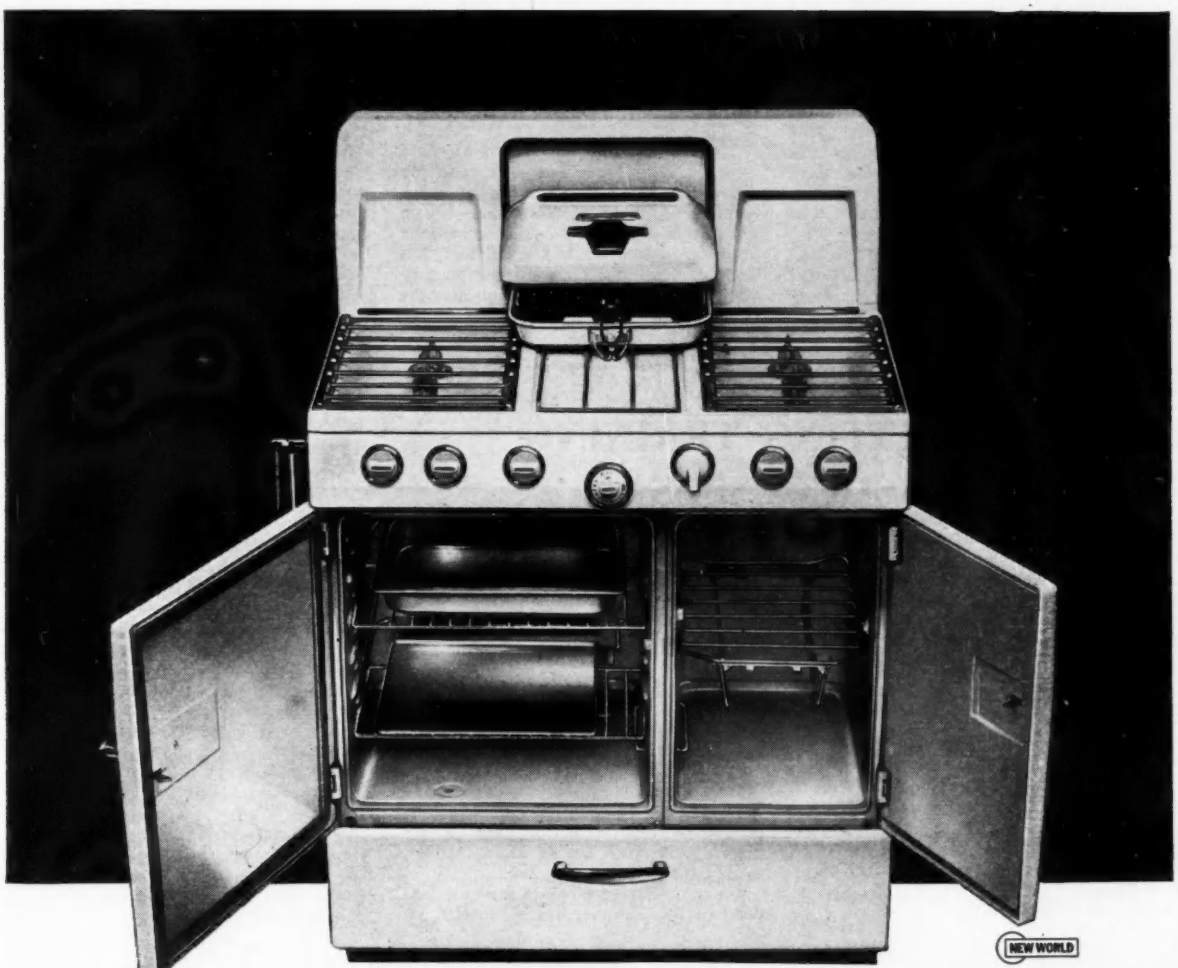
AND 173 GAS COOKERS



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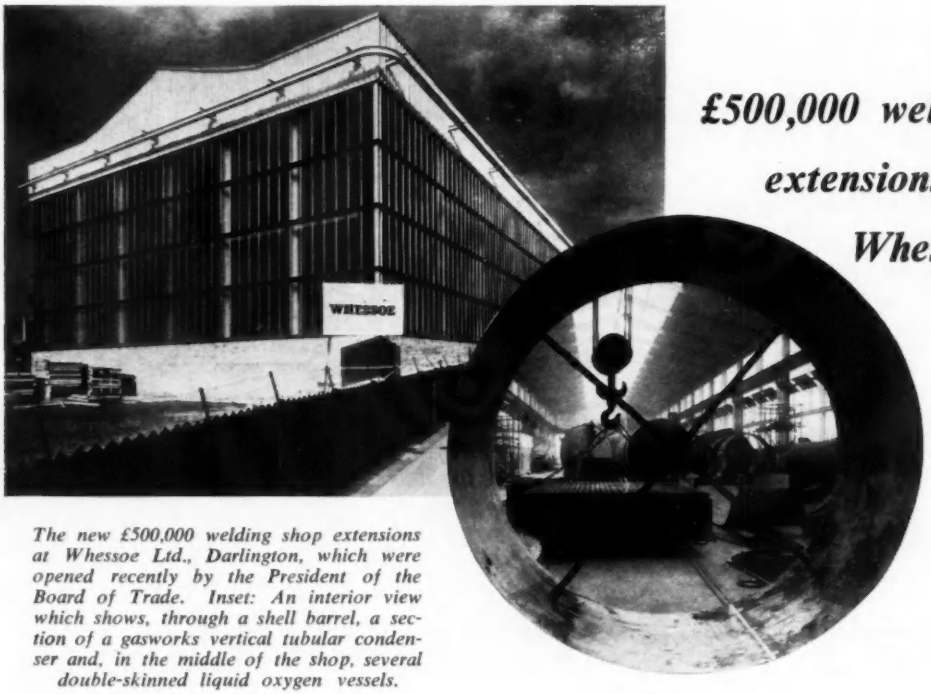

The new £500,000 welding shop extensions at Whessoe Ltd., Darlington, which were opened recently by the President of the Board of Trade. Inset: An interior view which shows, through a shell barrel, a section of a gasworks vertical tubular condenser and, in the middle of the shop, several double-skinned liquid oxygen vessels.

£500,000 welding shop extensions for Whessoe Ltd.

WELDING SHOP extensions for Whessoe Ltd., Darlington, which were opened by Mr. Frederick Erroll, President of the Board of Trade, earlier this month, represent an investment of £500,000. Since 1945 Whessoe has spent nearly £4 mill. on new workshops and equipment, over half of this being spent in the last five years.

The extensions will, it is believed, raise the total U.K. capacity for heavy pressure vessels (used by the petroleum and chemical industries in their manufacturing processes) by 10% and contribute greatly to the Company's export drive.

Already much of the Company's production at Darlington is exported, the export content of the £6 mill. annual throughput being 30%.

The new welding shop is an impressive structure 550 ft. long and 86 ft. wide and sets a high standard for industrial architecture. Able to handle vessels up to 125 tons in weight, it is equipped with the most up-to-date welding equipment, has a large X-ray building designed to take a million volt X-ray source and also the largest permanent stress relieving furnace in Europe.

This furnace is 85 ft. long, 18 ft. wide and 18 ft. high. It has a working temperature range of 400° C.-1,150° C.

Already at work, the new welding shop is at present handling, among others, vessels for the £900,000 contract Whessoe received earlier this year, after fierce international competition, for a crude oil conditioning plant for export to India. Other vessels in process of manufacture will hold the liquid oxygen used in boosting Britain's steel output.

GASFITTING TRAINING SUCCESSES

THE North Western Gas Board's target for making every apprentice a first-class gasfitter, set seven years ago, has been fully reached during the last three years, the Board's Chief Training and Education Officer, Mr. Harry Teasdale, has told a staff conference.

Out of 174 apprentices who completed their training during those three years, 161 qualified for a Final City and Guilds Certificate and the remaining 13 for an Intermediate Certificate.

In addition, considerably more than a third of the 174 apprentices gained further qualifications, including one Higher National Certificate and seven Ordinary National Certificates in Mechanical Engineering, and 27 Intermediate Certificates in Gas Utilisation.

'The proportion of apprentices who obtain additional qualifications will provide a reserve from which it will be possible to select men for further training as draughtsmen, salesmen, and supervisors,' said Mr. Teasdale.

'For this reason the Board have this year recruited 170 gasfitting apprentices.'

Simon dividend

THE Directors of Simon Engineering Ltd. have declared interim dividends on ordinary shares of 10% less income tax, for the year ending December 31, 1961, payable January 1, 1962.

On cumulative preference shares a dividend of 6% less tax, has been declared.

GAS DYING? IT'S 'WISHFUL THINKING'

THE Chairman of the Scottish Gas Board, Mr. Sydney Smith, speaking at a function in Glasgow, said that Glasgow Corporation's decision to use gas for the ducted warm-air heating system in recently constructed flats at Nitshill represented a major breakthrough for the gas industry against 'tactics in some quarters to exclude gas from new housing schemes in favour of electricity.'

The decision had attracted the interest of several local authorities in Scotland, he added.

'We hear some people say that gas is a dying industry. I think this is wishful thinking from certain quarters because they fear and respect our enterprise and vitality.'

Safety cookers for Belfast disabled

A HUMANE gesture for those who need it is how Councillor C. Cardwell, Chairman of the Belfast Corporation Gas Committee, described his committee's decision to provide safety cookers for hire to infirm and disabled people.

One of the cookers was on show in the committee room, and was explained to members.

The committee heard that the National Assistance Board had raised the question of providing safety gas appliances to disabled, infirm and aged persons.

Mr. James Dow, Gas Manager and Engineer, told the Committee that, based on the actual cost of the appliance, plus installation and maintenance charges, this equipment could be hired at an annual charge of £4—less than the charge in England—and he recommended that they be introduced forthwith.

Two cookers have been specially designed to make cooking easier for people with defective sight, or without the full use of their limbs. The burners, including the one for the oven, incorporate a device which ensures that the gas will not come on without ignition.

£170,000 COKE PLANT ORDER

A MEMBER of the Woodall-Duckham group, W. J. Jenkins and Co., of Retford, has received a £170,000 order from Guest Keen Iron and Steel Works, a branch of the G.K.N. Steel Company, for a coke handling and screening plant to be built at the East Moors works, Cardiff.

The Financial Times reports that the plant will have a handling capacity of 140 tons of coke an hour and it is expected to be in operation in 12 months.

SPECIALIST ENGINEERING

A NEW body has been set up to deal with matters of common interest to industries engaged on specialist engineering work on building and civil engineering projects.

The culmination of a number of years of informal co-operation between the founder-members, it is called the Committee of Associations of Specialist Engineering Contractors (C.A.S.E.C.). The founder-members are: Association of Heating, Ventilating and Domestic Engineering Employers; British Constructional Steelwork Association; and Electrical Contractors' Association (Incorp.).

East Midlands Board plans £300,000 reforming plant

THE East Midlands Gas Board has started to plan the building of a £300,000 reforming plant, which will be situated in Sheffield. A branch main off the main pipeline between Canvey Island and Ellesmere Port will run to the reforming plant.

A statement from the Board says: 'We are going to take 6 mill. cu.ft. a day, although this figure may be stepped up in five to seven years' time. This quantity represents 4% of our maximum daily output or, put another way, 6% of our annual output.

'We welcome the Minister's decision to import methane in that it will help us towards meeting our ever-increasing gas demand, particularly in the Sheffield area.'

The spokesman pointed out that this does not mean that only Sheffield will receive natural gas as, after reforming, the gas will be fed into the Board's integrated grid system and can therefore be pumped to wherever maximum demand occurs.

Numerous coalfields

The East Midlands Gas Board has numerous coalfields in its area, and on the question of coal the spokesman said: 'The methane importation will have no effect on coal so far as we are concerned, as we will continue to carbonise the same quantities and, so far as we can see, we shall continue to carbonise coal at the same rate for a long time to come.

'It must be remembered that we are "sitting" on two of the most important coalfields in the country so far as coal suitable for carbonising is concerned.'

Board uses employees' suggestions

SINCE the Suggestion Committee was formed about seven years ago, the North Eastern Gas Board has received over 250 suggestions from their employees, and last year alone the Board accepted 22, for which they paid £69 10s. in awards.

The awards vary according to the economies the idea achieves or their value as safety measures. The highest award yet paid was £30 to two installation workers for a new way of fitting gas fires.

The latest award—£15—has been paid to a works chemist who has suggested a way for draining rainwater from the crown of gasholders instead of letting it run down the sides and causing rust.

It is estimated that it will save the Board money because the holders will only need painting every five years instead of as at present, every three.

THE INSTITUTION and Junior Associations

Yorkshire Juniors

THE Deputy Chairman of the North Eastern Gas Board, Mr. S. G. Deavin, recently addressed the annual meeting of the Yorkshire Junior Gas Association.

He said that last year the Board had incurred a loss on revenue account, but he was sure they would all be in agreement with him when he said that this must be the last year in which a loss could be allowed to happen.

For the future, unless circumstances outside their control arose, they must balance their accounts, and accumulate something extra to enable them to meet temporary setbacks.

'In this area,' he said, 'we are again examining, with the production engineers and the distribution engineers, ways and means of securing these improvements.

'The same exercise is being carried out with general managers and group accountants, to continue to seek ways and means of rooting out wasteful expenditure and ascertaining in what directions we could profitably employ additional expenditure.

'Much work has already been done in all these directions. The biggest effort to bring the greatest dividends must come from the sales and service side of our business, because here the opportunities are boundless.

'Gone are the days when the engineer said to the salesman "This is what I can produce. You go and sell it." Today the salesman should say to the engineer "This is what I have sold. You go and make it."—and may the headaches all be with the engineer.'

Work study

THE Yorkshire Junior Gas Association met at the North Eastern Gas Board headquarters in Leeds recently to hear Mr. J. G. Gaunt, Works Study Officer to the Board, read his paper on 'Work Study and People.'

The paper began with a mention of pioneers of method study back in 1771-1858, users of the stop watch (1792) and time study (1856-1915), motion study (1868-1924), and then went on to deal with developments up to present day practice.

Gas industry team wins first aid trophy

THE men's team from Derby were the winners for the gas industry of the Grand Prior's Trophy—the premier award for first aid competitions in this country, organised by the St. John Ambulance Association, at the Porchester Halls, London.

The team from the East Midlands Gas Board scored 282½ marks out of a maximum 400, beating the National Coal Board miners' competition team, who came second.

It is the first time that the gas industry has won the trophy, although the Derby team reached the finals in 1959, and were placed seventh on that occasion.

The contest was a severe one, and Derby were up against teams from the police, fire brigades, British Transport Commission and St. John Ambulance Brigade itself.

In the women's competition, the gas industry was represented by the Scottish Gas Board team from Glasgow, who came eighth, with 269 marks out of 400. The winners were the Electricity Supply Ambulance Centre team from Manchester who scored 299 marks.

THE WINNING E.M.G.B. TEAM

The men from Derby who brought victory for the gas industry in the Grand Prior's Trophy competitions at the Porchester Halls, London. With the team is the Deputy Chairman of the Board, Mr. E. H. Harman (second right) and their Divisional General Manager, Mr. K. L. Pearce (third left). Members of the team are:—T. Johnson (Captain) holding the Trophy, C. Collier, E. Stone, H. Kerslake and E. Mylemas (reserve).

TRADE NOTES

MUREX WELDING PROCESSES LTD. have recently had completed extensions costing £350,000 at Waltham Cross, Hertfordshire. The new buildings consist of a 500-ft. long single-storey production shop having an uninterrupted floor area of 62,000 sq.ft. for the manufacture of electric arc welding plant, and a two-storey office block of 7,200 sq.ft. to accommodate the plant sales department, drawing office and works engineer's department.

METAL AND PIPELINE ENDURANCE LTD. have received the order for cathodic protection of the whole of the circulating water system at Dungeness Nuclear Station. The order includes comprehensive cathodic protection for pumps, pipelines, water boxes, intake and outfall structure.

METROPOLITAN LEATHER COMPANY LTD. has widened the scope of its production to cover the newer polymeric materials. It has been therefore decided to use the name METROPOLITAN FLEXIBLE PRODUCTS (A Division of Parkinson Cowan Ltd.).

FLEXIBOX LTD., Nash Road, Trafford Park, Manchester 17, have recently occupied a new additional office block. Although the original block was built less than five years ago, the move was necessitated by the growth in the company's business.

PERSONAL NOTES

MR. R. S. OWEN has been appointed by the East Midlands Gas Board as District Manager, Nottingham. He joined the North Middlesex Gas Company in 1930. After nationalisation he was transferred to the Headquarters Division, North Thames Gas Board and in 1956 was appointed service and sales manager, Northern Division, Scottish Gas Board. On the merging of the Northern and Central Division in 1960, he was appointed district manager, Dundee and Angus.

MR. P. J. STEVENS has terminated his 33-year association with Stamford Engineering Co. Ltd., of which he has been managing director for over 25 years. His intention is to concentrate on building up the business of the company which he now controls, Carter Bros. (Billingshurst) Ltd., which manufactures plastic pipe, general extrusions, and injection mouldings.

MR. E. W. THOMAS, area manager of Bratt Colbran Ltd. has left the company to take over an hotel in Sussex. Mr. Thomas spent the whole of his business life in the gas industry, having joined the old South Suburban Gas Company in 1924. He had been with Bratt Colbran since 1948.

MR. B. I. STONE, who for many years has been in charge of the London office of the Bryan Donkin Co., Ltd., has been appointed a Director of the Company. He will continue to be based on the London office and direct the selling, servicing and installation activities for the Southern area. MR. B. KEMP, who has been assistant to Mr. Stone at London office for many years, has been appointed Installation Manager for the Southern area.

MR. A. C. JONES has been appointed an Assistant General Manager within the automatic control valves group of Elliott Brothers (London) Ltd. Mr. Jones, who is 39, spent several years in the United States, training with leading American companies in the control and instrumentation field.

MR. V. STOTT has been elected to the Board of Directors of Glover and Main Ltd. Mr. Stott is Managing Director of James Stott & Co. (Engineers) Ltd., a member company of the Glover and Main Group.

MR. L. DAVIES has been appointed a Director of Pulsometer Pumps Ltd. of Reading, and has assumed the responsibilities and title of Works Director.

OBITUARY

MR. WILFRED BESWICK, who retired from the chairmanship of Power-Gas Corporation Ltd. in July, 1951, after completing 50 years with the Company, died in Harrogate recently, aged 88.

COMING EVENTS

December 14.—LONDON AND SOUTHERN JUNIORS: Visit to J. Lyons & Co. Ltd., Cadby Hall, London, W.14.

December 19. — NORTHERN JUNIORS: Blyth. Short paper meeting. 2.30 p.m.